March 17, 1925. 1,529,871

J. P. CONROY ET AL

GAS HEATER

Filed July 7, 1924 2 Sheets-Sheet 1

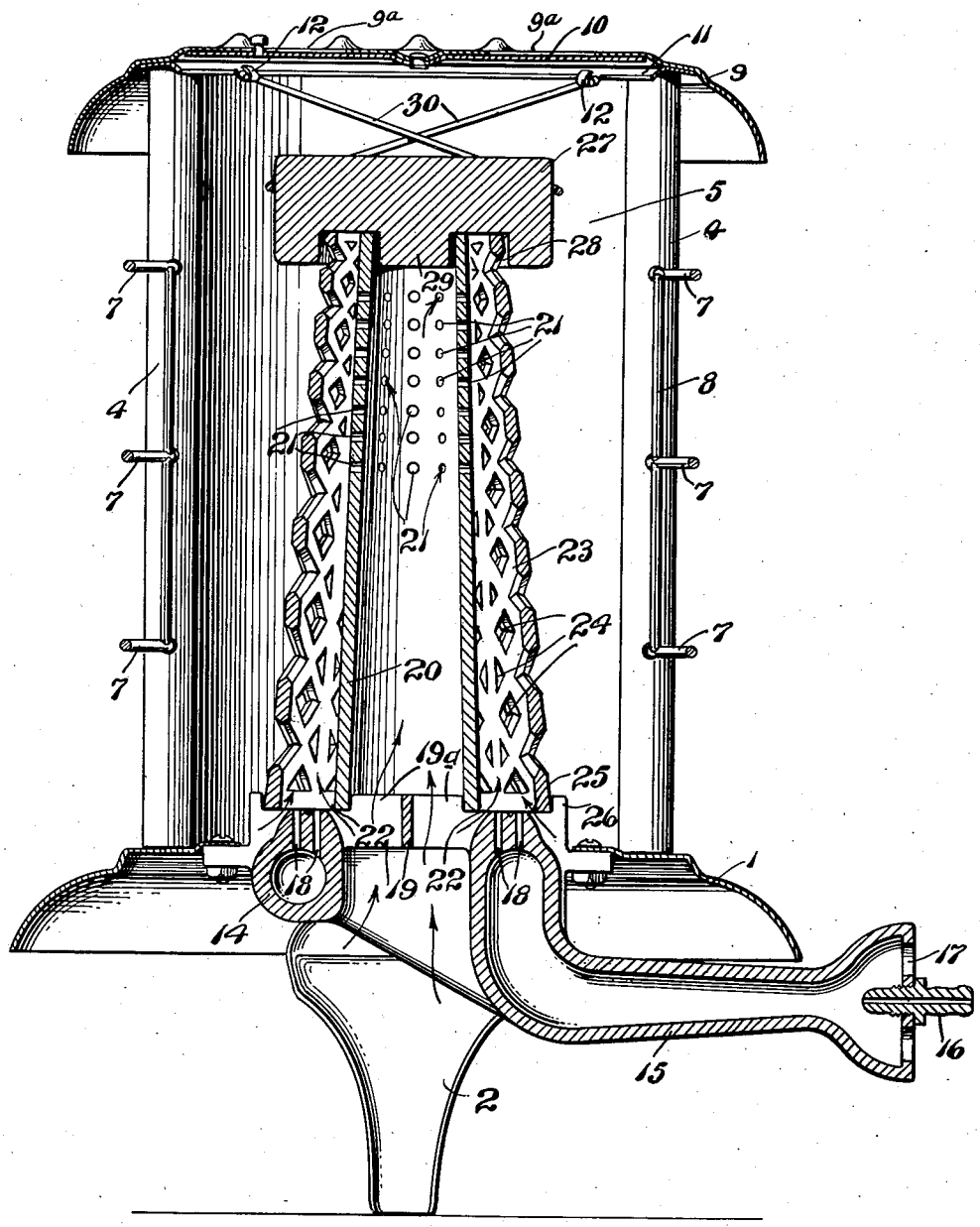


Fig. 1.

Inventors
James P. Conroy,
Arthur L. Zwisler
By Frank E. Liverance, Jr.
Attorney.

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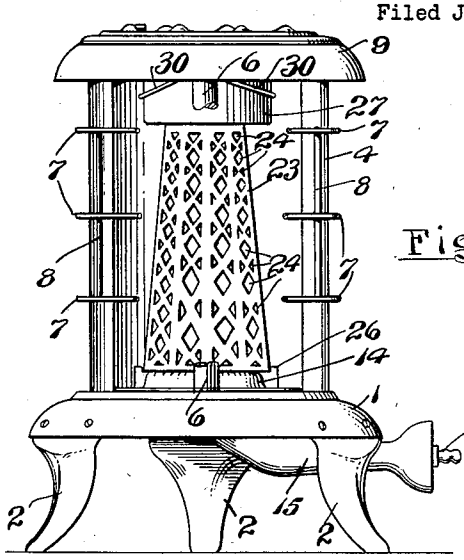


Fig. 3.

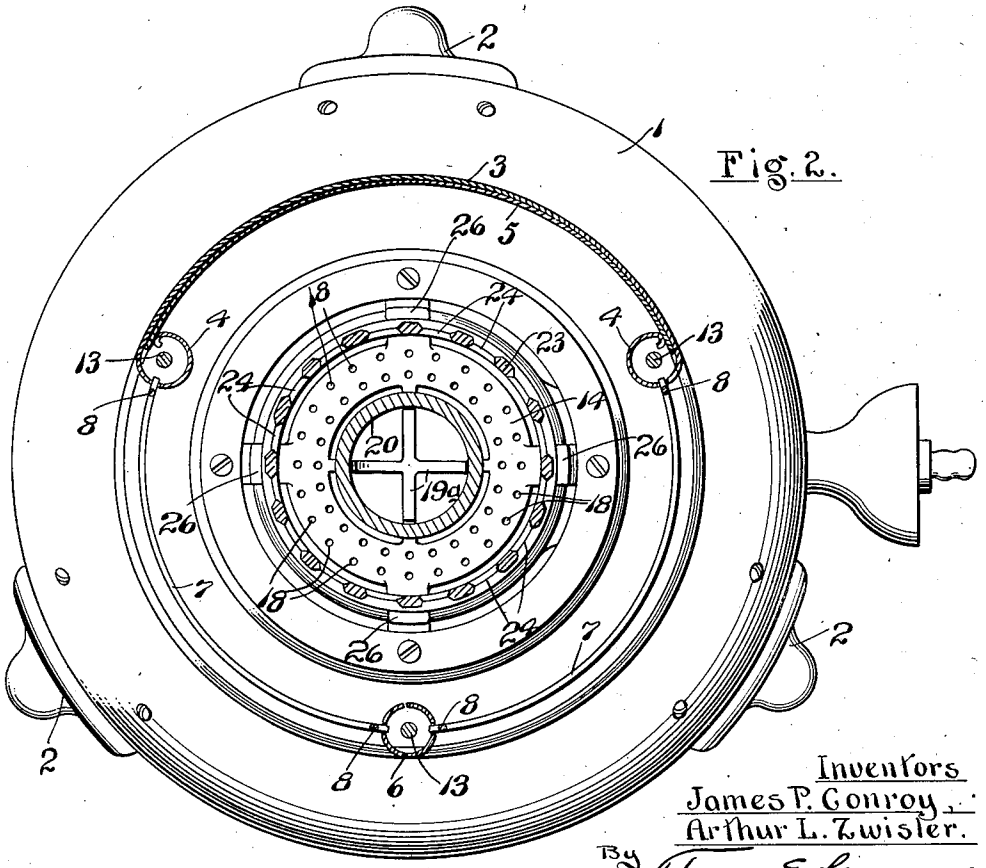


Fig. 2.

Inventors
James P. Conroy,
Arthur L. Twister.
By Frank E. Livernash, Jr.
Attorney.

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UNITED STATES PATENT OFFICE.

JAMES P. CONROY, OF NEW YORK, N. Y., AND ARTHUR L. ZWISLER, OF KALAMAZOO, MICHIGAN.

GAS HEATER.

Application filed July 7, 1924. Serial No. 724,581.

To all whom it may concern:

Be it known that we, JAMES P. CONROY and ARTHUR L. ZWISLER, citizens of the United States of America, residing at New York city and Kalamazoo, in the counties of New York and Kalamazoo, States of New York and Michigan, respectively, have invented certain new and useful Improvements in Gas Heaters; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a heater in which gaseous fuel is used and burned for the production of heat. It is a primary object and purpose of our invention to provide a construction of heater wherein an absolutely complete burning of the fuel is obtained there being no products of incomplete combustion given off from the heater which may be dangerous or which may have a bad odor. A further object of the invention is to provide a relatively simple and compact construction of heater which can be manufactured at low cost and produced and sold commercially at a profit at a comparatively low price. Further objects of the invention than those stated will appear as understanding of the invention is had from the following description, taken in connection with the accompanying drawings, in which—

Fig. 1 is a central vertical section through the heater, the plane of the section being parallel to the front of the heater.

Fig. 2 is a horizontal section through the heater, and

Fig. 3 is a front elevation thereof with certain parts broken away for better disclosure of the immediate radiant construction.

Like reference characters refer to like parts in the different views of the drawings.

In the construction of the heater, a base 1 of sheet metal is provided which may be supported a distance above the floor by means of suitable legs 2 connected thereto by screws in the usual manner. A sheet metal plate 3 is positioned vertically above and rests on the base, this plate being curved in the arc of a circle and, at its ends, curled inwardly making substantially cylindrical posts 4. The plate is located at the back of the heater and on its front side, a curved reflector 5 of suitable metal is located, at its ends being held between the ends of the plate 3 when curled to make the posts 4 as shown in Fig. 2. Plates 3 and 5 fill only a portion of the back of the heater and at the front an additional post 6 is located extending upwardly from the base 1 substantially midway between the two posts 4. Guards comprising horizontal spaced apart wires 7 connected by vertical wires 8 are disposed between the posts 4 and 6 the projecting ends of the wires 7 entering openings made in the posts 4 and 6 so as to hold the guards in position, the same being readily removed or replaced whenever necessary.

At the upper ends of the plates 3 and 5 and posts 4 and 6 a top member 9 of sheet metal is located. It may be provided with suitable openings 9^a which may be opened or closed by means of a shutter plate 10 movably mounted on the under side of the top 9. A metal member 11 is also secured on the under side of the top 9 and at its edges are equipped with tongues turned back upon themselves to make hooks 12, as shown in Fig. 1, for a purpose which will later appear. Rods 13 pass downwardly through the top of the posts 4 and 6 and the bottom 1 for securing the base, the back and the top together.

The base 1 has a central opening through which a burner 14 of circular form projects the same having an annular passage therethrough for carrying mixed air and fuel which comes to the burner through a lateral conduit 15 cast integral with the burner in the end of which is the usual gas fuel nozzle 16 surrounded by inlet air passages 17 of the usual construction in a Bunsen burner for mixing the air with gas. In the upper side of the burner 14 a large number of vertical passages 18 are made for the escape of the mixed air and fuel upwardly. Integral cross ribs 19 located at right angles to each other extend across the circular opening enclosed by the burner 14; and these ribs are formed of upwardly extending portions 19^a forming a positioning guide for the lower end of a center core 20 which is seated thereover. This core is hollow and tapers slightly upwards, the upper end portion thereof having a plurality of holes 21 made through its walls. It is evident that air passing upwardly into the core between cross ribs 19 may escape through the openings 21. The lower edge of the core 20 is seated inwardly

a short distance from the inner walls of the burner 14 whereby open passages 22 are made between the burner and the core for the passage of air upwardly on the outside of the core.

An outer member 23 also of frusto-conical form, and sometimes termed a "radiant," is located around the inner core 20 and has a large number of openings 24 therethrough as shown so that the outer member has a substantially lattice appearance. The base of this member is large enough to surround the burner with open spaces 25 between the outer side of the burner and the inner sides of the said member for the entrance of air therethrough and the radiant is held in position by upwardly projecting lugs 26 cast integral with and extending upwardly from the burner casting, as shown in Figs. 1 and 2.

At the upper end of the inner core 20 and the radiant 23, a cover member or head 27 is located being solid in cross section and having an annular recess 28 in its lower side sufficiently wide to receive the upper ends of the members 20 and 23, the upper end of the core 20 receiving the downwardly projecting portion 29 of the head 27 which is left when the recess 28 is cut. Bails 30 are pivotally connected to and depend from the hooks 12 heretofore described, crossing each other and passing around the head 27 so that whenever it is desired the head may be lifted above the upper ends of members 20 and 23 and frictionally held by the bails, as when it is desired to remove the radiant and inner core for replacement or repair.

The core 20, radiant 23 and head 27 are of refractory material capable of sustaining a very high degree of temperature. When the mixed air and fuel passes from the burner through the passages 18 and is lighted, the flame is confined between the core and the radiant 23. Air is supplied to the fuel in addition to that passing through the opening 17 by passing through the openings 22 and 25 and also openings 24 in the radiant. In addition imperfect combustion which may occur where air only is supplied at these lower points adjacent the burner is obviated by the incomplete elements of combustion rising between the core and radiant and receiving additional heated air through the opening 21 of the inner core whereby an absolutely complete combustion of the fuel is obtained with an increase of heat and a heating of the radiant throughout its entire length to a very high degree of temperature such that it becomes incandescent. The heat is given off from the radiant and that which projects to the rear is again forwardly projected by the reflector 5 so that all of the heat is radiated into the room where the heater is positioned.

The construction while simple is especially efficient for the complete combustion of gaseous fuel in heaters. Various ways of getting air from the inner core outwardly to the fuel besides through the openings 21 may be resorted to and it should be understood that the particular specific type of openings shown at 21 and the distance to which such openings may extend downwardly is subject to a great deal of variation without in any respect departing from the invention. This construction has been fully tested and severely tried and has proved especially practical and efficient in all respects.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

We claim:

1. In a device of the class described, a circular burner having an annular passage therethrough and openings made upwardly through the upper side of the burner from said passage, a vertically positioned central hollow core supported on the burner and open at its lower end and located directly over the central opening surrounded by the burner, said core, adjacent its upper end portion having openings made through its sides, an outer radiant surrounding the core and having a plurality of openings through its sides, means for supporting the radiant on the burner and holding it spaced from the core, there being passages between the inner side of the burner and outer side of the core and other passages between the outer sides of the burner and inner sides of the radiant, and means closing the upper ends of the core and radiant.

2. In a device of the class described, a burner having a central opening therethrough for the passage of air, a hollow central core carried on the burner with its open lower end located directly over the opening through the burner, said core adjacent its upper end having passages through its sides and at its lower end having its outer sides located inside of the sides of the opening through the burner, and an outer radiant member around and spaced from the core, said radiant having a plurality of openings through its sides and its inner sides at the bottom thereof located outside of the outer sides of the burner.

3. In a device of the character described, a burner, an inner core and an outer radiant carried on and above the core, the fuel passed from the burner passing between the core and radiant, said radiant being provided with a plurality of openings through its sides, and means for supplying air between the said core and radiant at the upper portions thereof, said air passing through the core, substantially as described.

4. In a device of the character described,

a central vertical hollow core, a radiant surrounding and spaced from the core, said radiant being formed with a plurality of openings through its sides, a cap closing the upper end of the core and radiant, said core below the cap having passages through its sides for the passage of air from inside the core to between the core and radiant, and a fuel burner located at the lower end of the core and radiant and having fuel outlet passages at its upper side, the upper ends of which are located between said core and radiant.

5. In a device of the class described, a central vertical hollow core tapering upwardly, a radiant surrounding the core and also tapering upwardly and spaced from the core, means closing the upper end of the radiant, said core being formed so as to pass air from inside thereof to between the core and radiant, and a fuel burner located at the lower end of the radiant and core having fuel outlet passages delivering fuel to be burned between the core and radiant, said radiant having openings therethrough, substantially as and for the purposes described.

6. In a device of the character described, an outer radiant having openings in its sides, a hollow central core positioned lengthwise of the radiant, said core and radiant having open ends and being spaced from each other, a cap closing one end of the said radiant and core, said core having openings for the passage of air from inside thereof to between the radiant and core, and a fuel burner located at the opposite end of the radiant and core adapted to deliver fuel to be burned between said radiant and core, combined with means to supply air to said burning fuel at said opposite ends, substantially as described.

7. In a device of the character described, a horizontally located annular burner having openings in its upper side for fuel passage, a central hollow core tapering upwardly located over and bearing at its lower end on the burner inside of the said fuel passage openings, an outer radiant provided with openings through its sides surrounding and spaced from the core and bearing at its lower end against the burner outside of the fuel passage openings, said radiant also tapering upwardly and being closer to the core at its upper than at its lower end, said core at its upper portion having a plurality of openings through its sides, and a cap removably located at and closing the upper ends of the core and radiant.

8. A construction containing the elements in combination defined in claim 7, combined with a frame located around the said radiant, a reflector carried by said frame vertically back of the radiant, a top to the frame, and means connected to the top and engaging said cap adapted to hold it in position above the said core and radiant or permit it to bear against the upper ends thereof.

9. In a device of the character described, a burner, a core supported in vertical position on the burner and tapering upwardly, a radiant surrounding and spaced from the core and also tapering upwardly, said burner delivering fuel to be burned between said core and radiant and said radiant being more widely spaced from the core at its lower than at its upper end, substantially as described.

In testimony whereof we affix our signatures.

JAMES P. CONROY.
ARTHUR L. ZWISLER.